

## ABSTRACT OF THE DISCLOSURE

An optical router and its method of use. The router is integrated in an InP-based substrate bonded to a single thermo-electric cooler for packet-based networks utilizing wavelength-division multiplexing (WDM) on silica fibers. Input and output arrayed waveguide gratings (AWGs) respectively demultiplex and multiplex the WDM signals to and from multiple transmission fibers. Input and output wavelength converters are connected between the input and outputs AWGs and a switching AWG. The output converts may include a tunable laser and interferometer formed in the same substrate. The header information is preferably carried out-of-channel from the WDM data signals, either in the same fiber band or a different one. Photodetectors and laser diodes are formed in the same substrate. Fast RF electronics are formed in GaAs chips and slower electronics formed in a silicon chip are bonded to the InP wafer.